

# THE LAST INSTAR LARVAL MOUTHPARTS OF *MICRODON MUTABILIS* (L.) AND *M. MYRMICAE* SCHÖNRÖGGE *ET AL* (DIPT.: SYRPHIDAE)

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## Abstract

*Microdon myrmicae* Schönrogge *et al.* and *M. mutabilis* (L.) *sensu* Schönrogge *et al.* (Diptera: Syrphidae) are discussed in relation to their larval mouthparts. It is evident that these features may be used to aid separation of the two taxa. A revised key to the puparia of European *Microdon* species is presented.

## Introduction

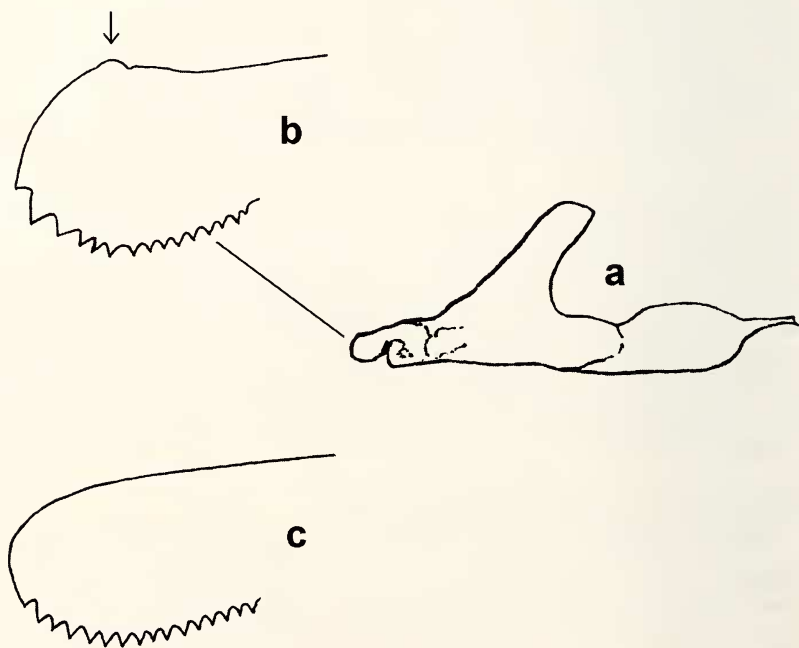
Schönrogge *et al.* (2002a, b) base separation of their new species, *Microdon myrmicae*, from *M. mutabilis* (L.), on features of the developmental stages and ecology of these taxa. Although they do provide morphometric features to aid in distinguishing the adults, these features are difficult to measure correctly and interpret, and of untested application to *Microdon* populations other than those studied by Schönrogge *et al.* – which were all from either Britain or Ireland. This makes identification of the developmental stages of paramount importance in recognition of the species. Schönrogge *et al.* (2002a) also restrict application of the name *mutabilis* L., to populations of *M. mutabilis* that use the ant *Formica lemani* as host, on well-drained, open ground sites. Whether this nomenclatural act is justified is not at issue here, but in order to refer unambiguously to the taxon they now recognise as *M. mutabilis* it now becomes necessary to call it *M. mutabilis* (L.) *sensu* Schönrogge *et al.*, a practice that has been followed in this note.

In reviewing the larval and puparial features of *M. mutabilis* (L.) *sensu* Schönrogge *et al.* and *M. myrmicae*, Schönrogge *et al.* (2002a) do not refer to the larval mouthparts. Examination of the larval mouthparts, based on material provided by Karsten Schönrogge, demonstrates that they may be used to aid in separation of these two taxa. The feature involved is illustrated here, in Figure 1, and a modified key to the puparia of European *Microdon* species is presented, incorporating reference to this feature.

## Key to puparia of European *Microdon* species

1. Surface of puparium covered in a network of shallow ridges, composed of setate papillae.....3  
— most of dorsum of puparium smooth and bare, without setate papillae .....2
2. Anterior respiratory process c1.5× as long as its maximum breadth; antero-dorsal edge of larval mouth hooks with a small, but distinct bulge (fig. 1b) .....  
.....*myrmicae* Schönrogge *et al.*  
— anterior respiratory process broader than high; antero-dorsal edge of larval mouth hooks smoothly curved (fig. 1c).....*mutabilis* (L.) *sensu* Schönrogge *et al.*

3. Bare patches within the network of setate papillae no broader than the basal diameter of the posterior spiracular process .....**4**  
 — bare patches within the network of setate papillae including some on the dorsal half of the puparial surface which are  $2\times$  as broad as the basal diameter of the posterior spiracular process (anterior respiratory horns more than  $2\times$  as long as their basal diameter and very strongly curved).....*devius* (L.)
4. Anterior respiratory horns more than  $2\times$  as long as their basal diameter and straight; distance between dorsal and ventral edges of mouth hook greater in the distal third of its length than in the median third of its length.....*analis* (Macquart)  
 — anterior respiratory horns less than  $2\times$  as long as their basal diameter; distance between dorsal and ventral edge of mouth hook greater in the median third of its length than in the distal third of its length.....*miki* Doczkal & Schmid (not known to occur in either Ireland or Great Britain)



**Fig.1:** *Microdon* final instar larval mouthparts. a = mouthparts of *M. myrmicae*, as found attached antero-medially on the inner surface of the floor of the puparium; b = mouth hook of *M. myrmicae*, arrow indicating bulge on dorsal edge; c = mouth hook of *M. mutabilis* sensu Schönrogge *et al*, showing smoothly curved dorsal edge (see text).

The mouthparts of the mature larva are sclerotised and remain attached to the inner, ventral wall of the puparium, and so are available for examination in a recently hatched puparium. Karsten Schönrogge kindly provided me with empty puparia of both *M. myrmicae* and *M. mutabilis* (L.) *sensu* Schönrogge *et al.*, complete with the plates carrying the anterior respiratory processes (henceforth referred to as ARP), which are diagnostic for these taxa. The larval mouthparts were carefully removed from these puparia (n = 4, in each case), and compared, revealing the differences in the mouth hooks alluded to above. The possibility of distinguishing these two taxa based on features of the larval mouth hooks extends the range of identifiable material to include puparia from which the ARP have been lost, but the larval mouthparts remain attached. This may seem only a marginal improvement in the previous situation. However, the ARP are located on a plate which is burst open during the process of eclosion of the adult insect from the puparium, the separate pieces of this plate then usually becoming detached from the puparium. Freshly hatched puparia collected from an ants' nest may thus lack the ARP, rendering them unidentifiable if determination is based entirely on ARP features. The larval mouthparts are not affected by eclosion of the adult and thus remain attached to the puparium. For how long empty puparia of *M. myrmicae* may remain available after eclosion of the adult is uncertain, since the ant host (*Myrmica scabrinodis*) apparently normally destroys the empty puparia (Schönrogge, pers. comm.). However, puparia of *M. mutabilis* (L.) *sensu* Schönrogge *et al.* are not so immediately destroyed by their ant host (*Formica lemani*), so the potential for confirmation of their identity from examination of attached larval mouthparts could prove useful. It is to be hoped that the differences in their larval mouthparts can also be used in confirmation of the identity of the larvae of these two *Microdon* species.

### Acknowledgements

I am extremely grateful to Karsten Schönrogge for puparia of both *M. myrmicae* and *M. mutabilis sensu* Schönrogge *et al.*, and for his considerable patience in answering my numerous queries concerning *M. myrmicae*.

### References

- Schönrogge, K., Barr, B., Wardlaw, J. C., Napper, E., Gardner, M. G., Breen, J., Elmes, G. W. & Thomas, J. A. (2002a). When rare species become endangered: cryptic speciation in myrmecophilous hoverflies. *Biological J. Linn. Soc.* **75**: 291-300.
- , (2002b) Addendum. When rare species become endangered: cryptic speciation in myrmecophilous hoverflies. *Biological J. Linn. Soc.* **76**: 315.
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